



Practitioner's Docket No. 49639 (70820)  
PATENT

AF/2674  
#12  
10-203  
NP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Y. Kubota, et al.  
Application No.: 09/523,511 Group No.: 2674  
Filed: March 10, 2000 Examiner: Dinh, Duc Q.  
For: SHIFT REGISTER CIRCUIT, IMAGE DISPLAY APPARATUS HAVING THE  
CIRCUIT, AND DRIVING METHOD FOR LCD DEVICES

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SEP 25 2003

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Mail Stop: Official Draftsperson  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

TRANSMITTAL OF FORMAL DRAWINGS

In response to the NOTICE OF INFORMAL DRAWINGS mailed on June 18, 2003,  
date

attached please find:

(a) the formal drawing(s) for this application.

Number of Sheets 29

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the

CERTIFICATE OF MAILING (37 C.F.R. SECTION 1.8(a))

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Kathryn A. Grindrod  
(type or print name of person mailing paper)

Date: September 16, 2003

Kathryn A. Grindrod  
Signature of person mailing paper

WARNING: "Facsimile transmissions are not permitted and if submitted will not be accorded a date of receipt" for "(4) Drawings submitted under sections 1.81, 1.83 through 1.85, 1.152, 1.165, 1.174, 1.437...." 37 C.F.R. section 1.6(d)(4).

*drawings to the proper application. This information should be placed on the back of each sheet of drawings a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page. In addition, a reference to the application number, or, if an application number has not been assigned, the inventor's name, may be included in the left-hand corner, provided that the reference appears within 1.5 cm (9/16 inch) from the top of the sheet" (37 C. F. R. Section 1.84(c)).*

[ X ] Each sheet of drawing indicates the identifying indicia suggested in section 1.84(c) on the reverse side of the drawing.

(b) a copy of the Office Action dated June 18, 2003, stating that Applicant's proposed drawing change is approved.

(c) a copy of the Amendment filed March 18, 2003, including proposed drawing change.

Date: September 16, 2003

David A. Tucker  
SIGNATURE OF PRACTITIONER

Reg. No. 27,840

David A. Tucker  
(type or print name of practitioner)  
Attorney for Applicant

Tel. No.: (617) 517-5508

Edwards & Angell, LLP  
P.O. Box 9169  
P.O. Address

Customer No.: 21874

Boston, MA 02209

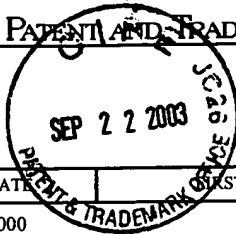
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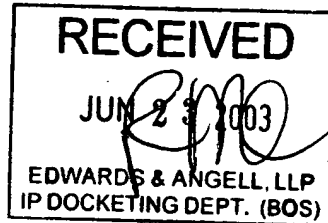
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APPLICATION NO.	FILING DATE	INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/523,511	03/10/2000	Yasushi Kubota	49639(820)	4950

21874 7590 06/18/2003  
EDWARDS & ANGELL, LLP  
P.O. BOX 9169  
BOSTON, MA 02209



EXAMINER
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DINH, DUC Q

ART UNIT	PAPER NUMBER
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2674

DATE MAILED: 06/18/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding

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**Office Action Summary**

Application No.

09/523,511

Applicant(s)

KUBOTA ET AL.

Examiner

DUC Q DINH

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --****Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 March 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 and 35-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,5,8-10,12,14,16,18,20,22,24 and 35-45 is/are allowed.
- 6) ☒ Claim(s) 2,3,6,11,13,15,17,19,21,23 and 25 is/are rejected.
- 7) ☒ Claim(s) 4 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

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**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 24 March 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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### DETAILED ACTION

#### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

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#### *Information Disclosure Statement*

2. The information disclosure statement (IDS) submitted on March 10<sup>th</sup>, 2000 has been received and entered. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### *Drawings*

3. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on March 24<sup>th</sup>, 2003 have been received and approved by the examiner. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

#### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cairns et al. (U. P. Patent No. 6,266,041), hereinafter, Cairns

In reference to claim 2, Cairns discloses in Fig. 3 a shift register comprising: a plurality of DFFs circuit 21 (latch circuits), clock signal line CK transmitting a clock signal, a plurality of switching circuits for performing electrical connection and disconnection between the clock signal line CK and the plurality of DFFs circuits.

It would have been obvious for one of ordinary skill in the art at the time of the invention was made to recognize that the left most switching circuit 23 electrically disconnects the left most the plurality of DFFs circuits from the clock signal at regular intervals determined by the output of the left most OR gate 22 as shown in Fig. 3. Moreover, FIG. 3 shows a data line driver circuit 20 in which the input and output of each DFF 21 is coupled to a respective input of an associated OR gate 22 which controls a pass gate 23 so as to ensure that only the required DFF's 21 are clocked by each clock pulse (col. 2, lines 41 – 46).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cairns as applied to claim 2 above, and further in view of Ogawa (U. P. Patent No. 6,018,331).

In reference to claim 3, Cairns discloses the signals HSYNC is vary in accordance with the pulse signal transferred and a plurality of switching circuit 23 each connect and disconnect corresponding to the latch circuit to/from the clock signal line CL. However, Cairns fails to discloses in at least one part of a period in which the pulse signal is transferred from a first latch circuit through a last latch circuit, the clock signal has frequency lower than a normal operation mode. Ogawa discloses in FIG. 5A, which shows a block diagram of source driver 104, start

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pulse (DX) 202 is supplied to the shift input of shift register 204. This start pulse (DX) 202 is sequentially shifted within shift register 204 in accordance with shift clock (CLX) 201. This shift output is supplied to each individual AND gate 207 opened by enable signal 203. The output of each AND gate 207 is supplied to the source line 206 of each picture element 205. In addition, as discloses Fig. 8, in one part of the least one part of a period in which the pulse signal is transferred from a first latch circuit through a last latch circuit, the clock signal has frequency lower than a normal operation .

It would have been obvious for one of ordinary skill in the art at the time of the invention was made to applied the method of frame display control of Ogawa in the device discloses by Cairns for providing an image display device that when displaying image signals having a number of picture elements fewer than the number of picture elements in the image display device in the center of the display device, and displaying a frame around the periphery of the displayed image, can display the frame adequately even in cases in which the input signals have a short horizontal blanking interval (col. 3, lines 10-15).

In reference to claim 6, Ogawa discloses the frequency difference as claimed

In reference to claims 11, Cairns discloses that as the shift register 51 is clocked by the clock signal CK, the state of each DFF 52 is passed to the next DFF along the register 51, and the effect of such clocking on the output C of the third DFF 52 from the left in the detail B is shown in the timing diagram of FIG. 7b, together with the clock signal CK and the horizontal synchronization signal HSYNC. It will be appreciated that the output C incorporates a series of pulses of the duration of one period of the clock signal CK corresponding to each '1' level separated by gaps of three clock periods corresponding to the three consecutive '0' levels, as

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well as a pulse of two clock periods corresponding to the two consecutive '1' levels. The form of such an output C is particularly useful for controlling each line driver 54 as will be described in more detail below. Since such a circuit will tend to cause adjacent line drivers 54 to commence their operative cycle at data rate clock intervals, this will have the effect of smoothing the power dissipation of the circuit. As a result the circuit may bring about a reduction in the amount of voltage supply compensation and minimize switching interference on the data lines (col. 7, line 59 – col. 8, line 3).

In reference to claim 13, Cairns discloses in FIG. 4 shows the general architecture of a digital line-at-a-time data line driver circuit 30 which comprises an input register 31 to which digital video data is supplied in 6 or 8 bit RGB format, a storage register 32 in the form of digital latches, and digital-to-analogue converters 33 connected to the outputs of the storage register 32 and supplied with reference voltages for applying data to the data lines by way of output buffers 34. As the digital data bits are supplied to the input register 31, they are stored in the register 32 and, when a whole line of data has been stored, the contents of the input register 31 is transferred to the storage register 32 in order to control the D/A converters 33. In the case of small screen displays, the D/A converters may be connected directly to the data lines so as to charge the data lines by simple charge sharing, although output buffers are required for higher performance displays. Control logic 35 is provided for controlling the input register 31, the storage register 32, the D/A converters 33 and the buffers 34 on receipt of appropriate control signals (col. 3, lines 4-21).

In reference to claim 15, Cairns discloses that the drive circuit comprising clock means for generating a clock signal, a shift register comprising a chain of control shift elements having

respective outputs, and a series of driver stages coupled to said outputs and controllable by control signals for sampling an input signal and for supplying the sampled signals to a corresponding series of lines, wherein each of the driver stages is associated with a respective one of the control shift elements and is locally controlled by a plurality of different control signals derived from signals generated by said one control shift element and/or at least one local control shift element in the vicinity of said one control shift element in the shift register in response to clocking of the shift register by the clock signal (col. 4, lines 12-26).

In reference to claims 17, 19, 21, Ogawa discloses an LCD having data driver and scan driver comprising a shift register circuit as claimed.

7. Claims 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cairns and Ogawa as applied to above claims, and further in view of Ino et al. (U. P. Patent No. 5,903,014), hereinafter Ino.

In reference to claims 23 and 25, Cairns and Ogawa fail to disclose the process to form the data driver. Ino discloses that semiconductor devices each having integrated thin film transistors and the like are particularly suitable for driving substrates of active matrix type electro-optical devices, and therefore, they are being extensively developed at present. A thin film transistor has a semiconducting thin film as an active layer, which is made from amorphous silicon or polycrystalline silicon. The polycrystalline silicon transistor is superior in electric characteristics such as a carrier mobility to the amorphous silicon transistor, and it can be used for a peripheral driving circuit as well as for a switching element. In this regard, studies are being actively conducted on the polycrystalline transistors. On the other hand, when used for an

active matrix display which is one example of the active matrix type electro-optical devices, the semiconductor device must adopt an inexpensive large-sized insulating substrate. From this viewpoint, there is a strong demand to develop a low temperature process capable of forming thin film transistors at a temperature in a range of 600.degree. C. or less, preferably, 400.degree. C. or less. Laser annealing or ion doping becomes important for the low temperature process. Moreover, from the standpoint of the structure, the thin film transistor is classified into a bottom-gate type (reversely staggered type) and a top-gate type. The bottom-gate type is superior to the top-gate type in terms of compatibility with the low temperature process (col. 1, lines 19-40).

It would have been obvious to use the process to produce the thin film transistor disclosed by Ino to make the data driver in the device of Cairns and Ogawa because it would provide the polycrystalline silicon transistor is superior in electric characteristics such as a carrier mobility to the amorphous silicon transistor, and it can be used for a peripheral driving circuit as well as for a switching element (col. 1, lines 19-25).

#### ***Response to Arguments***

8. Applicant's arguments, (see page 8 of the amendment, filed on March 24<sup>th</sup>, 2003), with respect to the rejection(s) of claim(s) 8-9 under 112, first paragraph have been fully considered and are persuasive. Therefore, the 112 rejection has been withdrawn and claims 8-9 are allowable. New claims 35-45 are allowable (by presented claim 4 in independent form including all of the limitations of its base claim and intervening claims).

9. In response to the argument (in page 10) cited that "examiner comments at page 3 of the Office Action must be directed erroneously to the limitations of the original filed claim 3" see the above rejection applied to claim 2.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., ... the limitations of originally filed claim 2 which is directed to initializing the shift register at regular interval during its operation in substantially the same way that initialization at power on is accomplished in claim 1) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Therefore, the rejection is maintained.

***Allowable Subject Matter***

10. Claims 1, 5, 8-10, 12, 14, 16, 18, 20, 22, 24 and 35-45 are allowed.
11. Claims 4 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: none of the cited prior art teaches or suggest a shift register in which "in at least one part of the period in which the pulse signal is transferred from a first latch circuit to a last latch circuit, the clock signal has a frequency which is lower than in a normal operation period and which gradually increases".

***Conclusion***

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **DUC Q DINH** whose telephone number is **(703) 306-5412**. The examiner can normally be reached on Mon-Fri from 8:00.AM-4:00.PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **RICHARD A HJERPE** can be reached on **(703) 305-4709**.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**Or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

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Hand-delivery response should be brought to: Crystal Park II, 2121 Crystal Drive,  
Arlington, Va Sixth Floor (Receptionist)

Any inquiry of a general nature or relating to the status of this application or proceeding  
should be directed to the Technology Center 2600 Customer Service Office whose telephone  
number is (703) 306-0377.

DUC Q DINH  
Examiner  
Art Unit 2674

DQD  
June 5, 2003



RICHARD HJERPE  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600